THE INVENTION CLAIMED IS:

1. A substrate transport system comprising:

a conveyor adapted to transport a substrate carrier; and

an unload mechanism adapted to unload the substrate carrier from the conveyor while the conveyor is moving the substrate carrier.

2. The substrate transport system of claim 1, further comprising:

a controller coupled to the unload mechanism and adapted to raise the unload mechanism while substantially matching a velocity of the unload mechanism to a velocity at which the substrate carrier is transported by the conveyor.

3. The substrate transport system of claim 2 wherein the controller is further adapted to cause the unload mechanism to contact the substrate carrier with substantially zero velocity or less in a vertical direction as the substrate carrier is transported by the conveyor.

4. The substrate carrier transport system of claim 2, wherein the conveyor includes a plurality of suspension assemblies, each suspension assembly adapted to suspend a respective substrate carrier from the conveyor.

5. The substrate carrier transport system of claim 4, wherein the unload mechanism is adapted to disengage the substrate carrier from one of the suspension assemblies as the unload mechanism is raised.

6. The substrate transport system of claim 1 wherein the unload mechanism is adapted to contact the substrate carrier with substantially zero velocity or less

in a vertical direction as the substrate carrier is transported by the conveyor.

7. The substrate carrier transport system of claim 2, wherein the unload mechanism is adapted to move through a circular path.

8. The substrate carrier transport system of claim 7, wherein the circular path is defined in a vertical plane.

9. The substrate carrier transport system of claim 2, wherein the unload mechanism includes a four bar mechanism.

10. The substrate carrier transport system of claim 1, wherein the substrate carrier is a single substrate carrier.

11. The substrate carrier transport system of claim 1, wherein the unload mechanism is also adapted to load a substrate carrier onto the conveyor as the conveyor is moving.

12. The substrate carrier transport system of claim 2, wherein the unload mechanism is adapted to move in a non-rotary path.

13. A method of operating a substrate carrier transport system, comprising:

using a conveyor to move a substrate carrier; and

while the substrate carrier is moving along the conveyor, unloading the substrate carrier from the conveyor.

14. The method of claim 13, wherein unloading the substrate carrier from the conveyor comprises moving an unload mechanism so that at a time when the unload mechanism contacts the substrate carrier a velocity of the unload member substantially matches a velocity at which the substrate carrier is moving along the conveyor.

15. The method of claim 14, wherein the unload mechanism contacts the substrate carrier with substantially zero acceleration or less.

16. The method of claim 13, further comprising, while the conveyor is moving, loading a substrate carrier onto the conveyor.

17. The method of claim 16, wherein loading the substrate carrier onto the conveyor comprises moving a load mechanism so that at a time when a substrate carrier being transported by the load mechanism contacts the conveyor, a velocity of the substrate carrier substantially matches a velocity at which the conveyor is moving.

18. The method of claim 17, wherein the substrate carrier contacts the conveyor with substantially zero acceleration or less.

19. The method of claim 17, wherein a single mechanism functions as the load mechanism and the unload mechanism.

20. The method of claim 13, further comprising moving the substrate carrier in a semi-circular path after the substrate carrier is disengaged from the conveyor.

21. The method of claim 20, wherein the semi-circular path is defined in a vertical plane.

22. The method of claim 13, further comprising moving the substrate carrier along a non-rotary path while unloading the substrate carrier from the conveyor.

23. A substrate carrier transport system comprising:

a conveyor adapted to transport a substrate carrier;

a load mechanism adapted to load the substrate carrier onto the conveyor while the conveyor is moving; and

an unload mechanism adapted to unload the substrate carrier from the conveyor while the substrate carrier is moving along the conveyor.

24. The substrate carrier transport system of claim 23, wherein the load mechanism and the unload mechanism are adapted to substantially match velocity between the substrate carrier and the conveyor, and between the substrate carrier and the unload mechanism, respectively, at the time of contact.

25. The substrate carrier transport system of claim 24, wherein:

during loading, the substrate carrier contacts the conveyor with substantially zero acceleration or less; and

during unloading, the unload mechanism contacts the substrate carrier with substantially zero acceleration or less.

26. A substrate carrier transport system comprising:

a conveyor adapted to transport a substrate carrier; and

a load/unload mechanism adapted to unload the substrate carrier from the conveyor while the substrate carrier is moving along the conveyor, and to load the substrate carrier onto the conveyor while the conveyor is moving.

27. The substrate carrier transport system of claim 26, wherein the load/unload mechanism is adapted to substantially match velocity between the substrate carrier and the conveyor, and between the substrate carrier and the load/unload mechanism, respectively, at a time of contact.

28. The substrate carrier transport system of claim 27, wherein:

during loading, the substrate carrier contacts the conveyor with substantially zero acceleration or less; and

during unloading, the load/unload mechanism contacts the substrate carrier with substantially zero acceleration or less.

29. The substrate carrier transport system of claim 23, wherein the conveyor includes a plurality of suspension assemblies, each suspension assembly adapted to suspend a respective substrate carrier from the conveyor.

30. A substrate loading station comprising:

a load port from which a substrate may be loaded to or from a processing tool;

a load/unload mechanism for loading or unloading substrate carriers to or from a factory transport mechanism, the load/unload mechanism being adapted so as to substantially match a velocity of a substrate carrier moving

along the factory transport mechanism when the load/unload mechanism initially contacts the substrate carrier; and

an apparatus for transporting a substrate carrier between the load/unload mechanism and the load port.

31. The substrate loading station of claim 30, further comprising at least one storage shelf for storing a substrate carrier, wherein the apparatus for transporting a substrate carrier between the load/unload mechanism and the load port is further adapted to transport substrate carriers to and from the at least one storage shelf.

32. The substrate loading station of claim 31, wherein the apparatus for transporting a substrate carrier comprises a substrate carrier handler having an end effector and a plurality of linear guides which allow the substrate carrier handler to move vertically and horizontally.

33. The substrate loading station of claim 30, wherein the load/unload mechanism comprises a rotatable member.

34. The substrate loading station of claim 30, wherein the load/unload mechanism is adapted to contact the substrate carrier with substantially zero acceleration or less.